 Sports Science – 4/5F STEM

Stage 3 Term 2/3 2016

Big idea/why does this learning matter?

* Is science important in sport?
* Can Science and Technology improve a person’s performance in sport?

Driving question

* Can we improve our sport performance at Emu Heights Public School by using our knowledge of Science and Technology?

Central syllabus ideas/concept

* Science and Technology – Materials and Human Body – [Science (incorporating Science and Technology K-6) K-10 Syllabus](http://syllabus.nesa.nsw.edu.au/science/science-k10/) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2012
* Mathematics – Numeration, Measurement & Geometry, Data – [Mathematics K-10 Syllabus](http://syllabus.nesa.nsw.edu.au/mathematics/mathematics-k10/) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2012
* English – Writing (Letter, Report, Explanation) – [English K-10 Syllabus](http://syllabus.nesa.nsw.edu.au/english/english-k10/) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2012
* Creative Arts – Design artwork – [Creative Arts K-6 Syllabus](http://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/creative-arts/creative-arts-k-6-syllabus) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2006
* PDHPE – Active Lifestyles – [Personal Development Health and Physical Education K-6 Syllabus](http://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/pdhpe/pdhpe-k-6-syllabus) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2007

Hook/entry event

The completion of the school basketball court. A visit by Panthers on the Prowl – fitness test and assessment.

Possible experts

Excursion to Penrith Basketball Centre. Possible experts – Panthers Educational Officer, Peter Wallace (Panther’s player), Jarrod (Basketball Educational Officer) Live Life Well team – food and diet experts. Sport manufacturers. Australian Institute of Sport.

Audience

Emu Heights School and Community, Panthers on the Prowl.

Culminating event

Create a new ‘ball bouncing space’ in the Wall Ball area of the school and launch a fitness program for a class that incorporates the findings of their science and technology experiments. Share STEM findings in a school exhibition.

Outcomes

Mathematics

* MA3-5NA – selects and applies appropriate strategies for addition and subtraction with counting numbers of any size
* MA3-6NA – selects and applies appropriate strategies for multiplication and division, and applies the order of operations to calculations involving more than one operation
* MA3-9MG – selects and uses the appropriate unit and device to measure lengths and distances, calculates perimeters, and converts between units of length
* MA3-16MG – measures and constructs angles, and applies angle relationships to find unknown angles
* MA3-10MG – selects and uses the appropriate unit to calculate areas, including areas of squares, rectangles and triangles
* MA3-15MG – manipulates, classifies and draws two – dimensional shapes, including equilateral, isosceles and scalene triangles, and describes their properties
* MA3-18SP – uses appropriate methods to collect data and constructs, interprets and evaluates data displays, including dot plots, line graphs and two-way tables
* MA3-2WM – selects and applies appropriate problem – solving strategies, including the use of digital technologies, in undertaking investigations
* MA3-3WM – gives a valid reason for supporting one possible solution over another

English

* EN3-6B – uses knowledge of sentence structure, grammar, punctuation and vocabulary to respond to and compose clear and cohesive texts in different media and technologies
* EN3-2A – composes, edits and presents well-structured and coherent texts
* EN3-3A – uses an integrated range of skills, strategies and knowledge to read, view and comprehend a wide range of texts in different media and technologies

Science and Technology

* ST3-5WT – plans and implements a design process, selecting a range of tools, equipment, materials and techniques to produce solutions that address the design criteria and identified constraints
* ST3-13MW – describes how the properties of materials determine their use for specific purposes
* ST3-4WS – investigates by posing questions, including testable questions, making predictions and gathering data to draw evidence – based conclusions and develop explanations
* ST2-7PW – describes everyday interactions between objects that result from contact and non-contact forces
  + investigate the effect of forces on the behaviour of objects, eg dropping, bouncing or rolling objects
  + observe the way the force of gravity pulls objects towards the Earth, eg dropping objects from different heights
  + observe everyday situations where the direct contact force (friction) affects the movement of objects on different surfaces, eg a bike or skateboard/ball

STAGE 4

* WS8 – students solve problems by:
  1. using identified strategies to suggest possible solutions to a familiar problem
  2. describing different strategies that could be employed to solve an identified problem with a scientific component
  3. using scientific knowledge and findings from investigations to evaluate claims (ACSIS132, ACSIS234)
  4. using cause and effect relationships to explain ideas and findings
  5. evaluating the appropriateness of different strategies for solving an identified problem

PDHPE

* LS3.6 – shows how to maintain and improve the quality of an active lifestyle.
* GSS3.8 – applies movement skills in games and sports that require communication, cooperation, decision making and observation of rules.
* PHS3.12 – explains the consequences of personal lifestyle choices.
* V5 – willingly participates in regular physical activity
* V6 – commits to realising their full potential
* DMS3.2 – makes informed decisions and accepts responsibility for consequences.
  + discriminates between a variety of products that are healthy and unhealthy, eg food, drinks
  + applies decision-making processes when choosing a recreational pursuit
* MOS3.4 – refines and applies movement skills creatively to a variety of challenging situations.
  + adapts throwing action to cater for different types of equipment for distance, accuracy and speed, eg netball, frisbee, shotput
* PSS3.5 – suggests, considers and selects appropriate alternatives when resolving problems.

1. devises a plan for more active use of the playground

Creative Arts

* VAS3.1 – Investigates subject matter in an attempt to represent likenesses of things in the world
  + Closely observes details of things in the world and seeks to make artworks about these
  + Utilises different artistic forms and explores how symbols may be used in their interpretation of selected subject matter
  + Explores subject matter of personal and social interest from particular viewpoints including objects, events, places and spaces.

Open-ended assessment opportunities

Students present ideas and designs for the improvement of the wall ball area of the playground and fitness findings. Students are asked to publicly explain the reasoning behind choices they made, their inquiry process, how they worked, what they learned and how science and technology influenced their decisions.

Assessments integrated across KLAs

| Week | Task | Evidence to collect |
| --- | --- | --- |
| Pre | Research and brainstorming  How can the school benefit from a new basketball court?  Do scientists have an impact on the changes made in sport?  Why do we play sport on particular surfaces? – Health safety issues | Concept mapping |
| Midpoint | * learning Journal – STEM Chronological learning journey incorporating all KLAs * ICT – Learning Journal – QR codes, iMovies * presentations on research * writing – letters to appropriate sporting institutions * students use feedback about their work to revise and improve it * advertise sporting products, fitness programs and healthy foods * research on sport science and healthy bodies * investigate area, scale, perimeter of basketball court and plan use of wall ball area * create iMovies/Powerpoints to advertise and promote their fitness and sport programs * survey students and produce evaluation forms so they can assess the success of their project * students research how sports have changed and how technology has supported the changes * students create a food diary and exercise diary * students collaboratively conduct a range of appropriate investigation methods (eg Do balls bounce higher on different surfaces?), including fair tests, to answer questions or solve problems * students use suitable equipment and materials, checking observations and measurements by repeating them where appropriate eg investigation into the different types of ball used in a sport * through constructing and using a range of representations, including tables, graphs (column, picture, line and divided bar graphs) and labelled diagrams, students collaboratively present their findings * students will be given the opportunity to reflect on their gathered evidence in relation to:   + the process used to gather, process and analyse their data and information   + their own prior knowledge as well as accepted scientific explanations   + their own and others' conclusions   Topics to investigate  Basketball skills, health, nutrition, sports medicine, strength, agility, beep test | Project-based learning   * It starts with a question or challenge * It is a student-centred activity * It requires critical thinking, collaboration and communication * It involves meaningful tasks * It is assessed on an individual basis   learning journals – draft book  checklist of outcomes with successes recorded (emotives)  writing samples (reports, letters)  letters to Panthers on the Prowl.  practical Science investigation – reports written and hypothesis rejected or accepted.  plans (sketches)  completed plans (drawings)  fitness diaries  fitness plans  New South Wales Department of Education Learning Tools Selector web application – <https://app.education.nsw.gov.au/learning-tools-selector/Search> |
| Post | Student work is made public by presenting it to people beyond the classroom.  Students present ideas and designs for the improvement of the wall ball area of the playground and fitness findings. Students are asked to publicly explain the reasoning behind choices they made, their inquiry process, how they worked, what they learned and how Science and Technology influenced their decisions.  Emu Heights collaborative STEM exhibition – invite community and media | present to school community and Panthers on the Prowl their findings through 21st Century based technologies. Introduce fitness program to Stage 2 classes. |